misidentifications of plants or animals, or both; and the listing of food plants eaten in captivity but not in nature. But he could hardly do much about these. It may be noted, however, that food plants mentioned merely as wild guesses have been listed without question or any qualification. The user must, therefore, beware.

The typography is a bit difficult to use, and there are quite a few typographical and spelling errors. Nevertheless this is an important book, and one that will be extremely useful for a great many years.

Alexander B. Klots
The American Museum of Natural History

Proceedings of the New York Entomological Society

(Meetings held in Room 129 of the American Museum of Natural History unless otherwise indicated.)

Meeting of March 6, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:10 p.m. 12 members and 4 guests were present. The minutes of the meeting of February 20, 1973, were approved as read.

Ms. Katharine Lawson of Hunter College and Ms. Iris Goldfarb of CCNY were elected to Student Membership. Ms. Lawson's interest is in ants, social insects, sensory-perceptual and social development. Ms. Goldfarb's interest is in development of orienting responses in spiders.

Mr. Les Greenberg of City College was proposed for Student Membership, and Mr. Roosevelt Hunt, Jr., was proposed for Active Membership. Mr. Greenberg is interested in social behavior in insects; Mr. Hunt's entomological specialties are Lepidopterans and Hymenopterans.

program. Dr. Karl Maramorosch introduced the speaker Dr. George Saul, Visiting Professor at Boyce Thompson Institute for Plant Research. Dr. Saul's talk on "Non-reciprocal cross incompatibility in the parasitic wasp *Mormoniella*" focused upon mechanisms involved in extranuclear inheritance.

The meeting was adjourned at 9:35 p.m.

Peter Moller, *Sec.*

NON-RECIPROCAL CROSS-INCOMPATIBILITY IN THE PARASITIC WASP MORMONIELLA

Mormoniella vitripennis (Walker) [= *Nasonia vitripennis* (Walker)] is used for studies in genetics, behavior, and host-parasite relations. Males are normally haploid and develop from unfertilized eggs; females develop from fertilized eggs and are normally diploid. About 85 percent of the progeny of mated females are female. Unmated females produce only male offspring.

Of more than 350 mutations which are now maintained in stocks, many affect eye color, and a high percentage of the eye-color mutations are alleles at the complex locus *R*. The *R* locus is composed of at least seven "factors," or series of completely linked genes. Four of the factors contain eye-color genes; the others contain genes affecting female

fertility or male viability. Many *R* locus genes are mutant in two or more factors.

In the early 1950s, the *R* locus mutation $R^{dast277}$ produced many spontaneous mutations when it was heterozygous. Two of these are the *R* locus mutations R^{pe-333} (peach, *pe*) and R^{ti-277} (tinged, *ti*). Both are mutant in two factors, are recessive to their wild-type allele, and change the reddish-brown wild-type eye color to light pink. In 1956, it was found that *ti* females gave no female progeny when crossed to wild-type males, and that crosses of *pe* females to wild-type males gave only about 8 percent female progeny. The reciprocal crosses gave normal frequencies of female progeny, so the cross-incompatibility is termed "non-reciprocal." Normal frequencies of females occur in each stock. With regard to incompatibility, *pe* and *ti* show the same characteristics as wild type when crossed with each other, showing that the incompatibility associated with *pe* differs from that of *ti*. Both types of incompatibility have appeared in stocks of other *R* locus mutants that arose from heterozygous $R^{dast277}$.

The *pe*-type incompatibility is transmitted from stock females to the few daughters that arise from crosses with wild-type males. Repeated backcrosses of such daughters to wild-type males for up to twenty backcross generations indicate that the strength of the incompatibility is influenced by the genome, but that the pattern of maternal transmission remains. Crosses of wild-type females by *pe* or *ti* males, followed by up to twenty generations of backcrossing of female progeny to males from the incompatible stock, yield no evidence of *de novo* incidence of incompatibility. The incompatibility is therefore maternally transmitted through the egg but is not transmitted by sperm. It is influenced by the genome but is not a gene product. It appears to be under extranuclear control.

The incompatibility is infectious and can be transmitted to wild-type females by injection or feeding of solutions prepared from homogenates of *pe* or *ti* females. In *ti* eggs, the incompatibility factor acts by preventing the formation of chromosomes by sperm pronuclei following fertilization of the eggs by wild-type sperm. Only a tangled mass of chromatin is formed, and the eggs develop as gynogenetic haploids. Incompatibility is not characterized by death of eggs or embryos.

Electron microscopy is currently being used in an attempt to find the incompatibility factors and determine their action on sperm pronuclei.

GEORGE B. SAUL 2ND

Meeting of March 20, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:30 P.M., in the Fifth Floor Lecture Room. 22 members and 46 guests were present.

The minutes of the meeting of March 6, 1973, were approved as read. In a short public relations speech President Topoff called for new members.

Mr. Les Greenberg of City College was elected to Student Membership. His interest is in social behavior in insects. Mr. Roosevelt Hunt, Jr., was elected to Active Membership. His interest is in Lepidopterans and Hymenopterans. Mr. William D. Sumlin III, of San Bernardino, was proposed for Active Membership. Mr. Sumlin's interests are bionomics and systematics of the adephagan Coleoptera.

PROGRAM. Before introducing the speaker Dr. Roman Vishniac, President Topoff expressed his thanks to Dr. John Cooke for his activities in the New York Entomological Society. Dr. Cooke is leaving the country and is going back to England. The audience thanked Dr. Cooke with enthusiastic applause.

Dr. Vishniac vividly remembered the days when he was President of the New York

Entomological Society, in 1941, and then talked about the "Romance of Entomology." His talk was illustrated by a series of color slides, the superb quality of which was most impressive.

It was announced that on April 3, 1973, our speaker will be Dr. Dominick J. Pirone, of Fordham University and Manhattan College, who will talk about "An insect Collector in Costa Rica."

The meeting was adjourned at 10:00 p.m.

Peter Moller, *Sec.*

Meeting of April 3, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:15 p.m. 18 members and 14 guests were present.

The minutes of the meeting of March 20, 1973, were approved with the correction that Dr. Roman Vishniac *joined* the New York Entomological Society in 1941.

Mr. William D. Sumlin III, of San Bernardino, was elected to Active Membership; his interest is in bionomics and systematics of the adephagan Coleoptera. Mr. Bernard H. Marcus, of Batavia, New York, was proposed for Active Membership; his interest is in aquatic insects.

program. Father Sullivan introduced the speaker Dr. Dominick J. Pirone, Fordham University and Manhattan College, who talked about his impressions and experiences as "An Insect Collector in Costa Rica."

It was announced that on April 17, 1973, our next speaker will be Dr. Charles L. Remington, Yale University, whose talk will be about "Ultraviolet Reflectants in Mimicry and Sexual Signals."

The meeting was adjourned at 9:40 p.m.

Peter Moller, *Sec.*

Meeting of April 17, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:15 p.m., 18 members and 18 guests were present.

The minutes of the meeting of April 3, 1973, were approved as read.

Bernard A. Marcus, Assistant Professor of Biology of Genessee Community College was elected to Active Membership. Oskar Dorfmann, of Steffisburg, Switzerland, was proposed for Active Membership. His interest is primarily in Lepidoptera.

program. Dr. Charles Remington of Yale was introduced by Father Sullivan. Dr. Remington gave a most interesting and exciting talk drawn from his investigations of the "Relations of Ultraviolet Reflective Patterns as Mimicry and Sexual Symbols in the Lepidoptera." Showing two slides simultaneously of the same mimicry complexes, one taken by normal human-eye viewing light and one in ultraviolet light, he compared the two as seen by insect eyes and man's.

The next meeting of the Society, on Tuesday, May 1, will present Dr. Norman Lin on the "Evolution of Social Behavior in Insects," Father Sullivan announced.

The meeting was adjourned at 10 p.m.

Joan M. DeWind, *Sec. Pro Tem*

ULTRAVIOLET REFLECTANCE IN MIMICRY AND SEXUAL SIGNALS IN THE LEPIDOPTERA

This talk was dedicated to the late Dr. Frank E. Lutz, long of the American Museum of Natural History, whose pioneering studies of ultraviolet (U.V.) perception in insects were carried out here almost exactly 50 years ago.

Reflectance patterns in the U.V. were investigated in a majority of the lepidopterous mimics of North and South America and Africa. Published work shows that it is likely: 1) that the birds and other vertebrate predators are the primary mimefactors controlling natural selection for aposematic (conspicuous signal) coloration in Lepidoptera; and 2) that insects but not vertebrates can see significantly into the near-U.V. (c. 300 to 380 nm). These two factors would have allowed insects to evolve U.V. reflectance signals for their own visual communication, separate from the limitations imposed by pressure for adaptive coloration in the visual range of potential vertebrate predators (c. 380 to 760 nm). My studies included inspection of wide-ranging geographic samples of several hundred species, by means of the Sony VCK portable video camera with a U.V. transmitting lens capped with a U.V. transmitting filter. From this survey the most interesting models, mimics, sexual morphs, and crepuscular species were then photographed with both U.V.-filtered reflectance and normal visible light.

Some mimicry results: 1) The appearance in U.V. versus visible light was substantially different in 18 of 20 models and 26 of 33 mimics scanned (some models have more than one mimic). 2) Among the 26 mimics with a U.V. reflectance pattern distinct from that in the visible, the resemblance to the model in U.V. was close in 10 of 13 from Africa, but in only 2 of 6 from South America and 2 of 7 from North America. Possible explanations are that more of the predators in Africa than in the New World can see in the U.V., or that mimetic selection has been developing longer in the African complexes and has been perfected there even in such minor expressions as appearance in the U.V.

Sexual signals tend to be monomorphic in U.V. reflectance for species in which the appearance of females is di- or polymorphic in our visible spectrum. This is spectacularly true in *Papilio glaucus* L., in which the blackish mimetic female form is essentially identical in U.V. to the yellow malelike form. *Hypolimnas bolina* (L.) shows the same U.V. similarity for visible female morphs in the Solomon Islands (but not in Fiji). In a major American model swallowtail, *Battus philenor* (L.), males and females appear much more unlike in U.V. than in visible reflectance, because in U.V. the submarginal pale spots absorb in males and reflect in females; again, the sexual recognition signal is simpler in U.V. than visible reflectance.

The possible role of U.V. reflectance in antihybridization signals is suggested in several genera of butterflies and diurnal moths. Interspecific differences are strong in U.V. in some groups of sympatric species that are near relatives, e.g., male *Colias eurytheme* Bdv. and *philodice* Gdt., *Alypia langtoni* Couper and *octomaculata* (Fabr.), and several *Actinote* species. In the moth genus *Annaphila*, *arvalis* H. Edw., *depicta* Grote, and *mera* Harvey are much more alike in visible than in U.V. reflectance.

A sampling of supposed crepuscular Lepidoptera showed, as predicted, a marked tendency for strong U.V. reflectance on pale areas. Notable examples are *Opsiphanes staudingeri* G. & S., *Stichophthalma camadeva* Westw., an undetermined crepuscular riodinid from Uruguay, several *Hepialus* (s. lat.), certain sematurid moths of the genera *Homidiana* and *Coronidia*, and the giant Indo-Malayan uraniid moths of the genus *Nyctalemon*. Presumably this functions for intraspecific recognition in low illumination.

Hypotheses to explain the early evolution of U.V. reflectance patterns in Lepidoptera were passed in review.

CHARLES L. REMINGTON
Yale University

Meeting of May 15, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:20 P.M. 19 members and 11 guests were present.

The minutes of the meeting of April 17, 1973, were approved as read.

The regular meeting scheduled for May 1, 1973 was cancelled to avoid an overlapping with the James Arthur Lecture.

Mr. Oskar Dorfmann of Steffisburg, Switzerland, was elected to Active Membership. His interest is primarily in Lepidoptera. Mr. Christian Thompson of New York was proposed for Active Membership. His interest is in flowerflies. Mr. Richard P. Seifert of SUNY at Stony Brook was proposed for Student Membership; his interest is in tropical ecology, Sphingidae, and Sphecidae.

Since this was the last meeting of the 1972–1973 season it was moved to elect the proposed candidates at the same meeting and not to wait for the next meeting as required by the by-laws. The vote in favor of the motion was unanimous. Mr. Thompson was elected to Active Membership and Mr. Seifert to Student Membership.

PROGRAM. Dr. Topoff introduced speakers Mr. Herbert Loebel, who showed three insect nature filmlets on—among other fascinating topics—the fate of the male praying mantis, and Miss Alice Gray, of the American Museum of Natural History, who introduced the audience to the art of Japanese origami, i.e., paperfolding. After completion of the requirements of this mini-course, folding one bug and one butterfly, members and guests participated in the Second "International Honey Tasting."

The meeting was adjourned at approximately 10 P.M.

PETER MOLLER, *Sec.*